98th Congress
1st Session

JOINT COMMITTEE PRINT

S. PRT. 98-98

THE ECONOMIC ISSUES OF A CHANGING TELECOMMUNICATIONS INDUSTRY

A STAFF STUDY

PREPARED FOR THE USE OF THE

SUBCOMMITTEE ON AGRICULTURE AND TRANSPORTATION

OF THE

JOINT ECONOMIC COMMITTEE CONGRESS OF THE UNITED STATES

OCTOBER 3, 1983

Printed for the use of the Joint Economic Committee

U.S. GOVERNMENT PRINTING OFFICE

25-134 O

WASHINGTON : 1983

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, D.C. 20402

J842-25

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LETTER OF TRANSMITTAL

SEPTEMBER 20, 1983.

Hon. ROGER W. JEPSEN,
Chairman, Joint Economic Committee,
Congress of the United States, Washington, D.C.

DEAR MR. CHAIRMAN: Transmitted herewith for the use of the members of the Subcommittee on Agriculture and Transportation, the Joint Economic Committee, and the public at large is a staff study entitled, "The Economic Issues of a Changing Telecommunications Industry," written by staff economist Dale Jahr. This study outlines how market forces and recent actions of the Justice Department and the Federal Communications Commission will affect the telecommunications industry and its customers.

One of the most important points of the study is dispelling the myth that all urban customers subsidize rural customers. To the contrary, most urban residents currently do not pay the full cost of the service provided to them. The subsidy flow, rather, is from high usage and highly profitable customers to low usage customers, independent of location.

Competitive forces will not produce uniform and entirely beneficial results. Because of the distribution and concentration of usage and since the profit motive will attract competition in lucrative markets, a relatively small number of customers will be responsible for benefits due to competition. As local basic service charges increase in the absence of subsidies, an inevitable and unacceptable consequence is discontinuation of service among our Nation's less affluent citizens. This occurrence contradicts the congressional commitment to universal telephone service.

Another major point discussed is the threat private networks, or "bypassers," pose to the public telephone network. The expanding use of private systems deprives the public network of revenues sufficient to cover its costs at reasonable rates to subscribers. This bypassing of the public network will continue to be a problem in years to come, jeopardizing the feasibility of universal service.

It is my hope that this study will make a contribution to the public debate of telecommunications policy.

Sincerely,

JAMES ABDNOR,
Chairman, Subcommittee on
Agriculture and Transportation.

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THE ECONOMIC ISSUES OF A CHANGING TELECOMMUNICATIONS INDUSTRY

I. INTRODUCTION

The impact of a changing telecommunications industry has been ushered into the arena of national attention recently, and the interest of Americans was captured finally by one of the most persuasive and powerful influences of everyday life—the pocketbook. After years of rigorous discussion confined to academic, government and industry circles, the issue is now of central concern to consumers, who will express their views to and expect action from industry officials, regulators and the Congress.

Today's telecommunications industry is the product of technology and public regulation. Formerly, government policy was focused on regulating a monopoly. The result of this governmental involvement, along with major technical advancement fostered by the industry, has been the provision at very reasonable user cost of a universal communications network unequaled in the world. In the past few years, however, federal policy has made a departure from its previous regulatory practice. In response to market forces, the Justice Department and the Administration recently have exposed the industry to competition. This action, while considered inevitable by many industry and government spokespersons, poses a number of difficult economic problems. The colloquial expression, "why fix something that ain't broke," appropriately comes to mind, especially if the end result may be the doubling or tripling of residential rates. Nevertheless, due to changes in the telecommunications industry, traditional regulatory practices have become increasingly ineffective in serving the public interest. Consequently, many Americans may face for the first time the threat of loss of service.

To formulate sound public policy, the goals for the telecommunications industry should be revised, redefined or established to accommodate for changes in the industry. Congress has the duty to determine what is in the public interest and establish a legal framework to attain those goals. First and foremost, consumer wants should be satisfied in an economic environment that allows the industry to satisfy those wants efficiently—at lowest possible cost and with the best utilization of resources. Second, the strengths and weaknesses of the economic environment, or market structure, should be identified so that the public interest can be monitored. Third, technical change should be allowed to progress unimpeded and unrestricted (except by economic feasibility), thereby allowing the benefits of improved and expanded services to fall

on consumers. Finally, the commitment to building, improving and maintaining a comprehensive, extensive national telephone network should be preserved. The phrase "universal service" has been used in many different ways in the 100 year history of the telephone industry, for both selfish and public-minded reasons. In this report, the concept of universal telephone service is to mean the availability of access to a national telecommunications network at its current level of penetration, and providing for greater penetration as improved technical and economic conditions permit.

Achieving these goals is indeed the challenge before the Congress. A desirable policy is to allow the free market to do what it does best: allocate resources optimally with accurate price signals prompting consumers to use services wisely and with profit signals prompting the entry and exit of firms to supply services as consumers dictate. This portrayal of a competitive market is not the structure of the telecommunications industry, however. The current structure is characterized as a monopoly because one firm dominates the industry and for that reason it is regulated. Abuse of monopolistic power is detrimental to society because prices are higher and the amount of goods and services offered is lower than what would occur in a competitive environment. Monopolies are also characterized as being slow to respond to changing and expanding consumer demands, since they are sole providers and hence face few ill-effects for neglecting consumer preferences.

The government's response and rightful role when the market fails to allocate resources efficiently is regulation and other forms of intervention in the marketplace. Regulation of rates of return, pricing structures, and cost accounting takes place at both the federal and state level, and the Justice Department gets involved with antitrust matters. Regulatory agencies have not been entirely successful in safeguarding the interests of consumers or treating fairly the providers of the service. The failure of government involvement to correct the problems of market failure plagues not only the telecommunications industry, but all industries facing regulation.

This report summarizes changes occurring in the industry and attempts to outline areas where telephone service may be jeopardized by these changes, particularly rural, residential and other high cost areas.

II. A PROFILE OF THE TELECOMMUNICATIONS INDUSTRY

Fast growing and fast changing, the telecommunications industry in its 100 year history has been exposed to dynamic economic pressures, and its performance record, for the most part, is very good. The use of telephone services, viewed as a luxury even 50 years ago, is a vital and important part of personal lives and the business world. Over 1,450 telephone companies offer service; 25 are a part of the Bell System. The Bell network, however, serves about 80 percent of all customers. In 1982, total investment amounted to over $200 billion, annual revenues approached $80 billion and over one million people were employed by the industry, indicating its significant size. In 1981 over 287 billion local and 34 billion toll (long distance) calls were made from the 182 million phones in service; on average, each telephone was used to make nearly 2,000 calls.

Industry growth has been phenomenal, far outpacing overall economic and population growth trends, indicating the greater role telecommunications plays in our society. Table 1 shows the twelve-year trend for several industry characteristics.

TABLE 1.—PATTERNS OF GROWTH IN THE TELEPHONE INDUSTRY

Year	Independents	Bell	Total
Number of telephone companies:			
1982	1,432	25	1,457
1981	1,459	25	1,484
1980	1,483	25	1,508
1975	1,618	25	1,643
1970	1,841	25	1,866
Access lines (in thousands):			
1982	21,672	86,921	108,593
1981	21,429	85,987	107,416
1980	20,808	83,854	104,662
1975	16,855	69,880	86,735
1970	13,125	58,829	71,954
Operating revenues (thousands omitted):			
1982	$13,978,858	$65,698,356	$79,677,214
1981	12,206,000	59,384,614	71,590,614
1980	10,475,000	51,865,610	62,340,610
1975	5,500,000	29,590,723	35,090,723
1970	2,891,814	17,368,544	20,260,358
Total plant:			
1982	41,941,431	160,198,838	202,140,269
1981	38,298,000	148,812,635	187,110,635
1980	35,300,000	135,524,245	170,824,245
1975	21,200,000	89,194,378	110,394,378
1970	12,390,327	56,171,376	68,561,703
Construction expenditures:			
1982	4,713,987	17,071,139	21,785,126
1981	4,852,000	18,442,408	23,294,408
1980	4,544,000	17,627,000	22,171,000
1975	2,422,000	9,525,000	11,947,000
1970	1,665,000	7,314,000	8,979,000

Source: USITA.

Rapid expansion prompted economies of scale and cost-saving technological advances. As a result, the relative cost of phone service has fallen dramatically through the years. In 1940 the average American worker had to work nearly six hours to pay for his monthly local service charge. The typical worker in 1983 had to work just one hour and twenty minutes. Telephone services have not increased in price as much as other goods and services in recent years. Since 1960, telephone service has increased about 60 percent. For comparison, the Consumer Price Index increased 226 percent in the same time frame, indicating that phone costs have not been a significant contributor to inflation.

Telephone industry characteristics reflect population and geographic traits of the United States. Population density, for example, varies dramatically. About 74 percent of the population resides in urban areas occupying just 1.5 percent of total land area. Urban centers generate the lion's share of telephone activity as a result. They also are characterized by large local exchanges, where local calls can be made by basic service customers at no extra charge over a wide area, and for a nominal flat fee or small usage charge to adjoining suburbs.

Rural areas face a different set of circumstances, obviously. Small towns have relatively few persons on a local exchange and some thinly populated rural areas have fewer than one subscriber per mile of telephone line. Over 1,400 telephone companies serve rural and residential areas. These companies are both profit-making firms and non-profit cooperatives. Independent, or non-Bell companies serve about 20 percent of the population, and generate about 18 percent of total telephone revenues, but provide service to nearly 60 percent of the land area of the U.S. As a result, investment costs per telephone are dramatically higher for those companies. This additional cost burden will be discussed later in the report.

Any phone company can qualify for financial assistance through the rural telephone programs of the Rural Electrification Administration (REA), U.S. Department of Agriculture. About 1,000 companies participate, and comply with the requirement that service cannot be denied to anyone desiring service in the area the company serves.

The REA established its rural telephone program in response to a 1949 act of Congress. Legislators recognized the benefits of promoting universal telephone service and promoted it as a social and economic goal. Congressmen and government officials realized that no profit signals or other market incentives existed to attract private industry to high cost areas. A low cost loan program was funded to encourage investment and development in those areas not served. The REA's involvement was a large success, indicated by the fact that over 96 percent of all households now have telephone service.

Besides dealing with a highly skewed distribution of people, the industry is confronted by a skewed distribution of phone usage, which contributes to a skewed revenue distribution as well. A very small percentage of customers account for a sizeable portion of total revenues. In 1983, one-half of all residential interstate long distance and three-fourths of all business interstate long distance revenue was generated by 10 percent of the customers in each category. In addition, 60 percent of WATS revenue came from 10 percent of the WATS locations.

As could be expected, a strong correlation exists between population and concentration of revenues. Most heavy users reside in large urban centers. This fact gives credence to the potential of bypass of local exchanges, or the establishment of private networks, which has profound implications for the other customers remaining on the public exchange. This issue will be discussed in greater detail in Chapter IV.

The nation as a whole shows wide variation in population density and phone usage, and most states demonstrate this trait as well. Almost all states have clusters of population in metropolitan areas and light density rural areas, with corresponding variation in telephone traffic. The following table demonstrates that revenue concentration exists in 38 states for which information was available.

TABLE 2.—BELL OPERATING COMPANY BUSINESS CUSTOMER REVENUES

[MTS, WATS, and Private Lines by State]

State	Percent of business customers	Percent of business revenues
Alabama	10.0	77
California	1.2	30
Connecticut	1.0	45
Florida	.5	47
Georgia	.5	50
Iowa	6.3	24
Kentucky	10.0	83
Louisiana	10.0	73
Maine	3.0	39
Massachusetts	3.0	55
Minnesota	6.4	28
Mississippi	10.0	69
Nebraska	.3	28
New Hampshire	3.0	44
New Jersey	3.0	36
New York	.3	33
North Carolina	.4	45
North Dakota	.9	9
Ohio	.5	45
Pennsylvania	1.0	40
Rhode Island	3.0	51
South Carolina	.5	41
South Dakota	2.0	50
Tennessee	10.0	81
Vermont	3.0	42
Washington	.5	40
Missouri, Oklahoma, Kansas, Arkansas, Texas	1.0	33
Arizona [1]	.3	30
Colorado [1]	.5	30

TABLE 2.—BELL OPERATING COMPANY BUSINESS CUSTOMER REVENUES—Continued

[MTS, WATS, and Private Lines by State]

State	Percent of business customers	Percent of business revenues
Idaho [1]	.6	30
Montana [1]	1.2	30
New Mexico [1]	.8	30
Utah [1]	.6	30
Wyoming [1]	1.0	30

[1] These figures were calculated to demonstrate the percentage of total business customers representing 30 percent of business revenues.
Source: AT&T.

Obviously the telephone industry is big business. The large cost and revenue bases are complicated by multiple and overlapping services, shared facilities, non traffic sensitive costs (fixed investment costs which do not vary with telephone usage) and traffic sensitive costs (which do vary with usage). In a market economy, industries attract resources by offering a rate of return commensurate to their value. Over $200 billion in assets, $63 billion of which is equity, generated some $80 billion in revenue and over $8 billion in net income in 1982, giving a rate of return on equity of about 13 percent. That return is regulated by law, but is comparable to rates of return for unregulated industries, allowing for risk-factor differences. This is not to imply that the telephone industry is risk-free, however; in fact, Moody's bond rating service recently has downgraded the ratings of many Bell Operating Companies.

Because a huge amount of fixed investment is required in the telephone industry, the financial requirement necessary to sustain the network is enormous. Total investment per phone in service is about $1,100. The phrase "subscriber plant costs" is used to describe the cost of providing phone service to customers. In 1981 the Bell System faced an average cost of $26 per phone line per month. Twenty-nine states have average costs exceeding the national average. However, because costs vary dramatically by location, the costs for individual states differ from $20 to $45. Within each state tremendous variation occurs also. Some rural cooperatives have per phone costs exceeding $100 monthly.

To help defray these costs, a portion of interstate and intrastate revenues are designed to help offset them, the remaining being satisfied by basic monthly service charges. Data for intrastate revenue support for total plan costs were not readily available, since that is a matter of state jurisdiction. The following table shows on a statewide basis the average plant cost per line, and the contribution to that cost that the FCC-mandated interstate allocation makes toward that cost. The third column shows what percentage the interstate allocation is of average cost. A higher percentage indicates a greater reliance on cross-subsidization of fixed costs.

TABLE 3.—TOTAL BOC SUBSCRIBER PLANT COSTS AND INTERSTATE ALLOCATION OF SUBSCRIBER PLANT COSTS PER SUBSCRIBER LINE PER MONTH 1981 BELL SYSTEM AT 10.92 PERCENT RETURN

[Rounded to nearest dollar]

Study area	Total subscriber plant cost per subscriber line	SPF interstate allocation subscriber line	SPF Factor 1981 average (percent)
Alabama	$32	$7	20.8
Arizona	28	12	42.6
Arkansas	33	9	28.8
California	27	6	24.0
Colorado	30	13	42.2
Connecticut	23	8	33.4
Delaware	24	8	34.0
Florida	35	13	36.2
Georgia	31	9	28.5
Idaho-MTN	27	9	35.3
Idaho-PNB	28	11	37.8
Illinois	22	6	26.4
Indiana	24	6	23.1
Iowa	25	7	28.2
Kansas	27	8	29.8
Kentucky-SCB	32	7	20.3
Kentucky-Cinn	22	3	13.0
Louisiana	34	7	19.9
Maine	25	7	29.9
Maryland	23	5	21.1
Massachusetts	23	6	27.5
Michigan	24	4	16.9
Minnesota	25	7	26.0
Mississippi	36	9	25.0
Missouri	25	7	26.3
Montana	27	12	44.5
Nebraska	27	10	36.9
Nevada	42	26	62.1
New Hampshire	28	12	43.0
New Jersey	22	7	31.5
New Mexico	27	10	36.0
New York	27	7	27.4
North Carolina	28	7	24.1
North Dakota	30	10	32.4
Ohio-Ohio bell	23	4	19.0
Ohio-Cinn	23	4	18.7
Oklahoma	26	8	31.8
Oregon	27	9	32.8
Pennsylvania	20	4	21.1
Rhode Island	22	6	28.4
South Carolina	32	7	22.0
South Dakota	28	10	36.2
Tennessee	27	6	22.2
Texas-SWB	30	7	22.6
Texas-MTN	21	7	33.0
Utah	24	8	31.4
Vermont	29	13	43.9
Virginia	26	7	26.7
Washington	24	7	30.1
West Virginia	32	7	21.5
Wisconsin	21	5	21.7
Wyoming	45	25	56.5
District of Columbia	23	10	41.9
System average	26	7	26.0

Since the Bell System serves the more populated areas of each state, the same information for independent companies would show even higher average costs and a much greater reliance on cross-subsidization.

The FCC calculates a measurement called "Unseparated Revenue requirement" which shows basically the nontraffic sensitive cost of "stringing" a network together (this measurement is not all fixed costs, but it provides meaningful comparisons of cost variations by location). The highest cost states by this analysis were Wyoming, Alaska, Mississippi, Florida, Arkansas, North Dakota, Louisiana, West Virgina, South Dakota and Kentucky. Twenty-nine states have costs exceeding the national average of $154. Table 4 shows annual unseparated revenue requirements by state for 1981.

TABLE 4.—*1981 unseparated revenue requirements by State*

State:	
Alabama	204.96
Alaska	248.56
Arizona	180.36
Arkansas	221.01
California	149.95
Colorado	169.19
Connecticut	117.02
Delaware	141.37
Florida	221.99
Georgia	186.84
Hawaii	99.58
Idaho	188.49
Illinois	114.81
Indiana	141.98
Iowa	144.29
Kansas	166.91
Kentucky	197.25
Louisiana	209.61
Maine	160.23
Maryland	123.96
Massachusetts	108.20
Michigan	149.55
Minnesota	152.80
Mississippi	239.23
Missouri	150.34
Montana	190.18
Nebraska	148.82
Nevada	162.10
New Hampshire	169.87
New Jersey	122.96
New Mexico	183.61
New York	142.06
North Carolina	167.87
North Dakota	216.54
Ohio	135.17
Oklahoma	166.93
Oregon	156.87
Pennsylvania	109.30
Rhode Island	104.59
South Carolina	197.56
South Dakota	203.33
Tennessee	169.11
Texas	179.70
Utah	140.23
Vermont	197.51
Virginia	164.58
Washington	142.86
West Virginia	206.76

Wisconsin	139.92
Wyoming	289.12
District of Columbia	73.87

Source: FCC.

High cost areas are not necessarily rural-dominant states, as casual observation may lead one to conclude. High growth areas such as Florida are subject to high costs as well. New towns and suburbs are requiring phone installation for the first time. This new investment is extremely costly because of inflation and the high cost of debt service these days. Where older, established parts of the U.S. are depreciating cheaper equipment and retiring low-interest debt, overall costs are lower.

This presentation of the cost structure is simplistic at best, but it illustrates the considerations and magnitude involved. Regrettably, the customer is usually not aware of the total cost picture, because his monthly bill does not itemize out and require direct payment for all costs incurred. The average monthly cost for providing a phone to a Bell System subscriber in 1981 was $26 (the figure for non-Bell subscribers would be even greater) when the cost charged to the subscriber for basic service was abut $9.16. The difference, almost $17, comes in large measure from cross-subsidies from long distance calling. Most residential customer's bills fall way short of generating the revenue support required to support phone service. Table 5 shows that in 1980, 40 percent of residential customers had long distance bills of less than $5, and about 58 percent had bills under $10.

TABLE 5.—*Distribution of residence message toll service (MTS) billing (second quarter, 1980)*

Average billing per month per household:	*Percent*
0.00	10.4
$0.01 to $0.99	7.4
$1.00 to $1.99	6.8
$2.00 to $2.99	6.0
$3.00 to $3.99	5.3
$4.00 to $4.99	4.6
$5.00 to $5.99	4.3
$6.00 to $6.99	3.7
$7.00 to $7.99	3.3
$8.00 to $8.99	3.2
$9.00 to $9.99	2.8
$10.00 to $10.99	2.8
$11.00 to $11.99	2.5
$12.00 to $13.99	4.7
$14.00 to $15.99	3.6
$16.00 to $17.99	3.2
$18.00 to $19.99	2.9
$20.00 to $22.99	3.4
$23.00 to $24.99	1.9
$25.00 to $29.99	3.9
$30.00 to $34.99	3.0
$35.00 to $39.99	2.1
$40.00 to $44.99	1.6
$45.00 to $49.99	1.3
$50.00 and greater	5.3

Source: AT&T.

If 1981 billing characteristics were similar to 1980, about 90 percent of all residential customers would not have paid for the aver-

age cost of having phone service.[1] In a purely competitive environment, the cost causer would be the cost payer. Advances in technology have allowed the FCC and Justice Department to permit competitive market forces in the telephone industry. While this change offers many advantages, most residential customers would face the certain consequence of higher prices for services that have been subsidized in the past.

[1] A more accurate analysis would compare average revenues and revenue requirements by exchange since costs vary considerably by location. Such data were not available, nor were data for marginal revenues and marginal costs, which is precisely the relevant information needed for rigorous analysis. However, industry calculations indicate that most residential customers do not pay the full cost of service.

III. THE ELEMENTS OF CHANGE

Of the many influences dictating structural change in the telephone industry, the strongest is the emergence of competitors in response to new opportunities brought about by regulatory permission and technical advancement. For years market forces were muted, ignored or met with disregard by both regulators and industry decision makers. These forces are hard to stop in the U.S. economy if consumers are to be treated fairly and if the true potential of the industry is to be realized. Government and industry officials may have been a little slow to accept the inevitability of changes in the market structure, but recent actions now pave the way for a new telecommunications environment.

To justify the change to an always and everywhere suspicious public, many industry analysts are touting the laurels of competition. Among the predictions are lower long distance charges, efficiency gains through using better pricing structures, productivity gains through technical advancement, and the introduction of a whole new array of telephone products and service as new suppliers respond quickly to consumer preferences. While all these benefits may well come true, not all customers will share in them. The ill-effects of shifting toward competition or quasi-competition must be recognized as well if future telecommunications policy is to provide adequate protection where the net market fails to serve the public interest.

The Justice Department and the Federal Communications Commission (FCC) have taken independent and bold action in the past few years to deal with structural changes. The Congress has attempted to provide the FCC a legislative direction but has failed to do so in the last several years. Following a decade of complex antitrust suits, the Justice Department and American Telephone and Telegraph (AT&T) settled their difference in 1982 by restructuring completely the dominant firm of the industry: hence the whole industry will take on a new appearance. The following highlights the major components of the agreement. Beginning in 1984—

AT&T will divest itself of its 22 local Bell Operating Companies (BOCs), which have reorganized into seven regional companies (RBOCs). Over 72 percent or $112 billion of assets will be transferred to the BOCs.

AT&T will retain its long lines (long distance) operation, which increasingly has been exposed to competition by firms such as MCI, Sprint, and SBS. Competition now will be encouraged in this market.

AT&T will be allowed to compete in areas where previously it was prohibited. This will occur in a newly created subsidiary called "AT&T Information Systems." Western Electric, the manufacturing division of AT&T, will continue as a supplier, but its exclusive affiliation with BOCs no longer will exist.

The distinction between intrastate and interstate long distance will be blurred partially by the establishment of new "Local Area and Transport Areas," or LATAs. BOCs will have control of intra-LATA, which will be provided by AT&T or other competitors. BOCs have to provide nondiscriminatory access to any firm desiring interconnection with local exchanges.

The divestiture plan is progressing steadily and cautiously, and some concern still exists about problems which may arise, such as jeopardizing national security interests, impeding U.S. technological advantage in the international market because AT&T was broken up, and unleashing its vast potential to enter into new competitive fields with the support of Bell Labs, thereby threatening the abilities of emerging firms' survival. The cost of divestiture is estimated at $2–$5 billion, which will be absorbed by customers, stockholders or both. A principal concern is whether BOCs will have the adequate financial support necessary to retain quality service. Loss of revenue may occur because of decreased cross-subsidies and the occurrence of bypass. Financing costs may rise because BOCs' credit ratings may not be as high as was AT&T's in the past.

The FCC has concentrated its efforts in reforming the interstate rate structure and promoting competition. Subscribers now can own their own phone if they desire, and are able to purchase one from a large number of suppliers at greatly reduced prices.

Over the past 40 years or more, telephone rates have been lowered significantly through technical improvements. Much of the cost-saving technology was in the long distance area, and a portion of long distance profits was directed to support local service operations. This cross-subsidization practice has led to some problems in the pricing and usage of telephone service and thus thwarted an accurate market response to price and profit signals. However, a defendable case for some degree of cross-subsidy exists due to the interdependence between local exchanges and the long distance carriers given a single national telephone network: the long distance network relies on local exchanges for call completion, and local exchanges must be connected to the long distance network to provide communication on a nation-wide basis. The case for cross subsidy has become more complex with the advent of competition in the long distance market and with potential bypass of the local exchanges. As might be expected, high cost areas are heavily reliant on cross subsidies.

In other words, the local exchanges are used for call completion by the long distance network, but the entire cost of local service, without cross subsidization, would be borne by local exchanges and their users. In the absence of an access charge or other settlement, a windfall benefit, or positive externality, would accrue to the long distance network, because it would gain necessary access to the local system for free. An externality is an economic cost or benefit created by one party and conveyed to another without compensation (for example, a polluting factory imposes external costs on the surrounding population due to damaging the environment, unless it compensates for that damage). These costs and benefits may be evened out or absorbed by an exchange of money sufficient to elim-

inate the externality. Essentially, the positive externality experienced by the long distance network is, for the most part, eliminated by the existing separations and settlements system. Though the size of the externality is difficult to measure, clearly some payment to the local operating companies is necessary to prevent free riding by the long distance network.

Through a system of "separations and settlements" long distance carriers (AT&T provides 96 percent of long distance traffic) contributed about $10 billion toward the maintenance of local phone networks in 1982. By 1984, that figure would be about $12.4 billion. Table 6 shows how each state paid and received revenue through the separations plan in 1982. The ratio column shows how local exchanges benefit from the cross-subsidy for revenue support; the higher the ratio, the greater the benefit. Indirectly, the ratio indicates how dependent local exchanges revenue bases are on long distance charges. High cost areas are correlated with high ratios.

TABLE 6.—INTERSTATE SEPARATIONS AND SETTLEMENTS, TELEPHONE INDUSTRY—YEAR 1982

[Millions of dollars]

State	Interstate NTS [1] (A)	Customer payments [2] (B)	Ratio (A÷B)
Alabama	121	128	0.95
Alaska	40	23	1.74
Arizona	214	150	1.43
Arkansas	100	81	1.24
California	1,142	862	1.33
Colorado	240	213	1.13
Connecticut	151	205	.74
Delaware	30	43	.70
Florida	863	600	1.44
Georgia	255	266	.96
Hawaii	40	56	.71
Idaho	65	48	1.35
Illinois	431	504	.86
Indiana	183	187	.98
Iowa	106	108	.98
Kansas	119	105	1.13
Kentucky	99	106	.93
Louisiana	144	152	.95
Maine	45	39	1.15
Maryland	126	203	.62
Massachusetts	218	296	.74
Michigan	214	250	.86
Minnesota	155	149	1.04
Mississippi	92	82	1.12
Missouri	190	209	.91
Montana	64	38	1.68
Nebraska	84	78	1.08
Nevada	114	97	1.18
New Hampshire	68	67	1.02
New Jersey	351	548	.64
New Mexico	81	68	1.19
New York	843	838	.99
North Carolina	191	205	.93
North Dakota	38	33	1.15
Ohio	271	336	.81
Oklahoma	168	156	1.08
Oregon	155	121	1.28
Pennsylvania	300	453	.66

TABLE 6.—INTERSTATE SEPARATIONS AND SETTLEMENTS, TELEPHONE INDUSTRY—YEAR 1982—Continued

[Millions of dollars]

State	Interstate NTS [1] (A)	Customer payments [2] (B)	Ratio (A÷B)
Puerto Rico	60	23	2.61
Rhode Island	37	49	.76
South Carolina	108	124	.87
South Dakota	37	29	1.28
Tennessee	138	184	.75
Texas	616	567	1.09
Utah	60	67	.90
Vermont	40	31	1.29
Virginia	214	262	.82
Virgin Islands	10	5	2.00
Washington	224	187	1.20
West Virginia	60	66	.91
Wisconsin	148	152	.97
Wyoming	70	43	1.63
District of Columbia	87	118	.74
Total	10,020	10,020	

[1] NTS (Non-Traffic Sensitive) represents only that portion allocated to interstate costs of connecting customers to the local telephone switching office. They do not include amounts in interstate settlements for local switching and trunking, interexchange plant, and dedicated facilities.
[2] Distribution on originating minutes.

Because this system of cross-subsidy creates distortions on prices and hence consumers' choices and usage of phone service, and because of the recent emphasis to make the industry competitive, the FCC has chosen to abandon the separations and settlements formula. In the absence of legislative alternatives becoming law, an access charge will be phased in over several years. This plan would relieve long distance couriers of the previous system's burden of supporting local service and shift it onto the subscriber directly. Initially, in 1984, a flat $2 residential and $6 business monthly charge would be added to the bill for basic service. If all subscribers paid $7 per month in an access charge over and above the flat monthly charge for local service, it would provide as much revenue as the previous system.

The access charge can be viewed in two different ways. Since it is a replacement for an established cross-subsidy practice, the charge can be considered to be a fee for having long distance services available in addition to local service. A second depiction of the access charge is very different from the first and makes the phrase a misnomer. The charge also can be viewed as a mechanism to transfer more of the actual cost of the local network onto the end user. This study endorses the former view and not the latter because of the interdependent relationship between local exchanges and long distance carriers.

The proceeds of the access charge would replace revenues lost from the current separations and settlements system and combined with a Universal Service Fund for redistribution to high cost areas. While the size of this revenue pool would not differ materially from the old system, the fund would be tapped from a completely different source. A long distance access charge imposes a flat

monthly fee regardless of the number of long distance calls made. On the other hand, the separations plan is usage-sensitive: long distance users pay for access to local exchanges every time a call is made.

Statistical information suggests that both approaches have problems. In 1980, 10 percent of Bell residential customers made no long distance calls whatsoever; over 40 percent made fewer than $5 worth. Even a $2 monthly access charge seems to be inordinately large relative to long distance usage. Since they do not make calls, these customers will not benefit from the predicted price decreases in long distance charges, either. The separations system places an extraordinary burden on high volume users of long distance services. A very small percentage of business customers generate billions of dollars of revenue.

The rational preference between these subsidy schemes does not divide along the line of an urban/rural split. Rather it divides along a high/low usage line. It is clearly a mistaken view to assume that millions of urban residential customers are heavily subsidizing residents in high cost areas. Transfers from low cost to high cost areas are contributed only by customers whose bills exceed the cost of providing service to them. Evidence indicates that most residential subscribers, both rural and urban, do not pay the full cost of that service. The overwhelming contribution comes from the relatively few high volume, highly profitable customers.

The emergence of competition in the telephone industry is not likely to benefit low usage customers if cost causers were to be cost payers. Urban customers may be able to access cheaper long distance service but only because of their proximity to high volume users, not because they are preferred customers. Profit signals do not exist to provide the benefits of competition for the "little guy," and consequently, many Americans will not see the rewards of a changing market structure. Competitive forces will appear only where the lure of profit exists: areas with large population and high volume users. This "natural" direction of market forces presents a formidable challenge to policy makers who have an obligation to the public as a whole.

IV. BYPASS: A THREAT TO THE PUBLIC TELEPHONE NETWORK

The era of private communications networks began years ago with the advent of satellites. Now, other technological advances are offering economically feasible communications alternatives which are within the reach of many information-intensive businesses. The profile of the telephone industry shows that conditions are ideal for an increasing number of customers to leave the public phone network. Growth in private communications systems is accelerating, and coinciding with this trend is the inevitability of financial problems for the remaining customers on public phone exchanges.

Problems can appear on two fronts. First, operating revenues would decline dramatically as the largest customers drop off the line. To maintain revenue requirements for the network, the cost of all other customers would have to increase significantly. For the purpose of illustration, the following associations demonstrate how rates or charges for customers would rise if a few large customers discontinued service: if 10 percent of revenues are lost, the cumulative revenue from remaining customers would have to increase by 11 percent to maintain the same amount of revenue as before; if 20 percent of revenues were lost, costs to the remaining customers would increase 25 percent; a 30 percent loss would mean a 43 percent increase to the remainder; a 40 percent loss would require a 67 percent rise for all others and a 50 percent loss of revenue would mean the remainder would see rates go up to a full 100 percent to maintain a constant level of revenues. This analysis, of course, assumes that costs do not change with subscriber "dropout." Because of the nature of the industry, in all likelihood costs will not fall, which is the second part of the bypass problem.

The telephone industry has a tremendous amount of fixed investment; these sunk costs cannot be recovered easily if bypass causes a surplus of capacity in a local or long distance network. In addition, the industry has a "natural monopoly" distinction. Because of certain economies of scale, average costs may rise as the exchange contracts. This extra cost would increase further the revenue problem illustrated in the preceding paragraph.

If bypassing becomes a widespread occurrence, the cost of both local and long distance service would rise, and that may give rise to "dropout" among typical or average telephone users. Obtaining empirical information on the responsiveness of customers to price increases is extremely difficult. At some point, customers can become sensitive to price increases and will elect to either decrease phone usage or discontinue service altogether. Large increases in price, thus, can lead to a significant decrease in the number of customers. Although dropout among typical phone users does not cause nearly as large a revenue problem as does bypass, the cur-

rent level of telephone penetration can decrease substantially if it occurs.

Universal service is jeopardized by both dropout and bypass, but bypass is the largest threat to the economic feasibility of the public phone network. The profits generated by large volume customers subsidize all other customers whose revenue contribution falls short of the cost of providing service. This applies to all areas of the country, high cost and low cost alike.

Table 2 from Chapter II gives evidence of the potential threat bypassing is to the public phone network. In the extreme, a combination of bypass and dropout could destabilize the existing public network to the point that providing any service would not be economically feasible.

V. RURAL AREAS: A SPECIAL CONSIDERATION

Almost all states have sizeable rural areas with relatively few people. About one-quarter of the population—some 53 million people—reside on over 98 percent of the land area of the United States. Population density in rural areas is 15 persons per square mile on average. In contrast, urban areas house about 2,800 persons per square mile.

When legislators determine that market forces would not automatically extend telephone service to rural areas, the authority of a Rural Electrification Administration was expanded to provide assistance and incentives. The REA currently has about 1,000 participants located in 46 states. This agency has been given challenging objectives: its participants must provide service to all persons desiring it within the area served by the company, offer comparable service and quality to that of urban areas, and charge reasonable and affordable local and toll rates.

Providing service in rural areas is indeed a costly proposition. Local exchanges receiving REA assistance average fewer than 900 subscribers, and half of all exchanges have fewer than 700 subscribers. Independent companies, some of which receive REA assistance, are also small in size typically. About half of the 10,300 non-Bell central offices have fewer than 1,000 subscribers. Rarely can exchanges of this size achieve any kind of economies of scale or take advantage of the leading edge of technical innovation. On the customer side, the value of basic monthly service is reduced because so few others can be reached in contrast to urban areas where local service places subscribers in touch with a large number residing in a large area. Hence, long distance charges are incurred to contact a larger audience in rural parts.

Costs on a per telephone basis are higher in rural areas because (1) the length of the local loop (telephone wire from the central office attached to telephone poles to serve customers along that route) is much longer than in urban areas, (2) the length of drop wire (the wire that comes from the telephone pole into individual homes and businesses) is much longer, and (3) the cost per customer or per minute for the switching function (the mechanical connection that puts two phones in contact with each other) is much higher.

Rural telephone service is not only most costly in absolute terms, but also in relative terms when income considerations are made. Annual household farm income in 1982 was $3,500 less than the non-farm median. Hence, phone expenses are a much greater share of personal income for rural residents than for their urban counterparts.

To balance out high overhead costs, rural phone systems are heavily reliant on toll charges to achieve revenue requirements. Refer to Tables 3 and 6 for substantiation. The contemplated changes in the separations and settlements system would have a

severe impact. For every $1.00 of long distance calls charged to a customer, the telephone company uses about $.35 to help defray the costs of local service.

Not only is local service more expensive, but also toll service is more expensive for the following reasons: (1) distances between local and toll office are greater than in urban areas; (2) economies of scale are not attained because of light population densities, and few if any high volume toll routes exit; (3) the cost for switching to access toll routes is relatively higher; and (4) people in rural areas can access far fewer people in a local exchange and therefore have to use toll routes to contact those not on the local exchange. Some urban areas have local service providing toll-free access to areas of several hundred square miles.

Competition in the long distant market almost certainly will cause local rates to increase as current cross-subsidies are eliminated. Long distance rates, too, probably will increase, not decrease as is the contention of competition advocates. Competition simply is not likely to come into play in rural areas. Since the volume of long distance usage is relatively small and the cost of providing service is high, no signals are present for competitive elements to move in and lower prices.

A general analogy to the price effects of airline deregulation can give an indication to what may happen to prices of long distance calls. Like phone service, airline service is characterized by high density routes. Competitive forces and price decreases were directed at those heavy routes. Service to branches off main routes saw no competition and dramatic increases in prices and curtailed schedules resulted instead. For a time, coast-to-coast air travel between New York and Los Angeles cost just $99, while the fare from a small city to another one half the distance away, was often double or triple that amount. Some analysts argue that airlines actually overcharge customers requiring service from some areas where little competition exists to sustain operations incurring a loss because of fierce competition and price wars.

The availability of telephone service in rural areas has greatly enhanced social and economic well-being. During the past 40 years, productivity in agriculture has exceeded all other industries, due in part to the connection to electricity and communications made possible by the REA. Social reasons cannot solely justify the provisions of phone service, but this external benefit cannot be ignored, since improved living and working conditions generally improve economic productivity.

Rural areas have no practical alternative to telephone service. In urban areas, alternatives do exist. If an urban resident elects not to be a subscriber, public pay telephones are available virtually everywhere. Another communication alternative is contact in person. Rural neighbors are often separated by great distance. When an emergency arises and quick communication is crucial to the situation, the telephone is irreplaceable and indispensible in rural settings.

Rural areas and residential areas have been the prime beneficiaries of government intervention in the communications market. The Congress can be credited with making great advances on its goal of universal service, and the REA played a vital role in carrying out legislative direction.

VI. THE CASE FOR UNIVERSAL SERVICE

Economic facts of life cannot be denied even if human nature forever desires "getting something for nothing." Providing telephone service has costs—costs which vary by location—and those costs must be recovered if resources are to remain in use. That is how the marketplace works and works well. Because of the direction public policy has gone over the past few decades, some of those costs have been hidden or displaced or averaged among millions of customers. Some uniformity in prices was pursued, and a desire to ensure that the price of basic service was within the reach of almost all Americans caused the price of that service to fall below the cost of providing it. The problem with below-cost pricing is that the service tends to be overused and undervalued. For this reason, the mechanism used to promote universal service in the past may jeopardize the concept in the future.

A strong case for universal service still exists. Although hard and conclusive evidence is difficult to obtain, the following observations are worthy of discussion:

The value of telephone service to all customers is enhanced by a complete nationwide network.

Quality of life measures, indicating the value of services such as emergency communications, entertainment and pleasure calls, and security checks, show that the well-being of phone users is greatly improved.

Basic contact with the outside world should be available to virtually all Americans at similar prices on the equity grounds of equal opportunity.

The basic phone link is but a conduit to a wide and growing array of communications and information services. As our economy becomes more computer-oriented, this connection becomes evermore important.

National security requirements and the public interest are served by keeping an extensive phone network intact.

Regional isolation of radically different prices by region run counter to polices promoting a united nation. Just as a uniform first class postage rate assures all Americans, regardless of location, access to written communication, persons in different locations should have the ability to communicate orally at roughly the same prices. Also, first class postage prices are independent of distance. As technology improved telephone service, costs have become less sensitive to distance. Where variable rates are justified based on distance, all customers should face about the same pricing schedule.

Gains through new technologies and competitive advantage need not be sacrificed to preserve universal service.

Business depends heavily on being able to contact the public at large. Universal service plays an important part in keeping the macroeconomy running smoothly and strong.

Conflicting goals are emerging in telecommunications policy: on one hand, universal service is hailed as essential and on the other, competition is being promoted. While competition has merits and rewards, it has explicit consequences which jeopardize the continuation of universal service. Cost recovery would be imposed on the source of the costs, prices would vary by volume, and high profits from certain services would disappear, reducing the revenue base of the network. Clearly a large share of residential customers and nearly all rural and high cost area customers will not share in the benefits of competition.

Fortunately, the two goals need not be mutually exclusive if flexibility is introduced. If price and profit signals are free to operate without distortion, efficiency and optimal allocation of resources will result. These signals are the most important aspect of the competitive market structure. Governmental involvement could assist those adversely affected by competition, and so long as intervention does not interfere with market signals (small taxes or fees are not likely to create irreparable distortion), everyone could share in the benefits of a changing telecommunications industry.

Regulators and legislators are favoring the creation of an access charge system supplementary Universal Service Fund (USF) to replace the current separations and settlements system of keeping basic service "affordable" (for most Americans it is cheap). How that USF is funded is the important question. As discussed earlier, the FCC favors imposing access charges on all users; legislators prefer imposing fees on providers of long distance services. Too high an access charge will hurt small usage customers. Too high a fee on providers will cause the fee to be passed onto high volume users and the bypass problem may be accentuated.

Other revenue sources can be initiated as well. For example, since public interest and national security issues are raised, general revenue funding could be considered. State funding could also be instituted for states which elect to promote universal service and affordable rates at levels different from national standards. Government funding is a clear departure from traditional subsidy sources, which industry and public officials may not endorse. They are mentioned as alternatives to give a broader perspective on what options are available to promote universal service.

The issue of bypass is central to the entire discussion of providing universal service and who should contribute toward sustaining this public goal. Private networks currently exist and contribute little or nothing to the public network, even though as private citizens they benefit from the merits of public availability. The great likelihood of increased private networking will have a profound effect on revenue bases of the public network, as explained earlier, causing rates and charges to sky-rocket for those remaining on the public. Although assessing a fee on bypassers may be protested because no association may exist between private and public networks, such a fee may be defended because a compelling public interest exists.

Regulators and industry officials complain that detection and measurement of bypassers is nearly impossible. However, this problem is not insurmountable. Bypassers must file with the FCC, so they can be identified. Second, if the bypasser leases from a communications firm the economic value of that lease can serve as a proxy for usage. If the bypasser owns the private network, its cost and capacity can be ascertained; then an economic value can be estimated. These economic values could then be used as a base from which a tax assessment could be made.

Another essential ingredient for preserving universal service is promoting efficiency. Many regulatory and industrial practices discourage efficient use of the phone network. Among them are the following:

Flat fee charges for local services keep customers from being cost-conscious, because the added cost of making an extra call now is precisely zero. Some customers make few local calls, and others make hundreds per month. Tempering a flat charge with a variable charge based on usage would optimize utilization of the local network.

Local phone usage, like long distance, varies by time of day. Accommodating peak times of demand requires substantial investment. If customers who make optional or pleasure calls during peak time were induced to make those calls during off-peak hours, the local system would be better utilized. Peak-demand pricing schemes would sensitive customers to this economic consideration, and they already are familiar with this practice in long distance pricing.

Marketing and pricing strategies can be altered to maintain adequate revenues. Besides introducing variable usage and peak demand rates, "package" pricing could be offered to encourage usage of all types of services, local, intrastate and interstate. Phone utilization would help to ensure the availability of the service.

Regulatory agencies have for years imposed impractical and uneconomic depreciation schedules for telephone plant and equipment. Little regard has been given to the "economic life" of equipment. Technological change has shortened the practical life of much equipment, and has made some obsolete, even though it still works. Where new equipment may lower costs to the customer, its introduction can be postponed because the old equipment is still imposing a cost to the company. Many depreciation schedules are 30 and 40 years in length where economic feasibility may be one-third to one-fourth that time span. An often-made comment is that a car can be used and made to last indefinitely if enough time, effort and money is invested in it. However, diminishing returns set in quickly after a few years and most people find it more practical and economical to replace them. However, if depreciation schedules are too liberal, then overinvestment is likely to occur, and that action is costly to the customer as well.

Rate-of-return regulation can cause investment distortion. If companies are guaranteed by law to earn a return on equity or assets, an incentive to overinvest is created, if those resources would not earn as great a return in alternative uses. In rural

areas where fixed investments are naturally very high, by rewarding that investment with guaranteed returns and subsidies, other forms of communication technology may be discouraged. For example, radio telephone systems in rural and remote areas may be cheaper to install than wired systems, but the lure of guaranteed returns may encourage the local exchange to install wires instead.

In summary, maintaining universal service can be accomplished through making regulators and customers more sensitive to the economic principles and considerations governing the provision of telephone service, and through establishing an adequate universal service fund. A compatible blending of economic solutions and social goals will make the telecommunications industry stronger and more responsive to the desires of consumers.

A GLOSSARY OF SELECTED TELECOMMUNICATIONS TERMS

Access Charge: A tariff imposed on customers or carriers for access to the telephone network.

American Telephone and Telegraph 1956 Consent Decree: A judicial settlement ending the Federal Government's 1949 antitrust suit against AT&T and Western Electric. Among the provisions was a restriction that the Bell System engage only in the manufacture of equipment and the provision of services related to regulated common carrier telecommunications services and those services incidental to the provision of such services.

American Telephone and Telegraph 1982 Consent Decree: A judicial settlement ending the Federal Government's 1974 antitrust suit against AT&T, Bell Labs, and Western Electric. Among the provisions was a restriction agreed to where the divestiture of the local exchange service and access functions of the 22 Bell operating companies as well as the modification of the AT&T 1956 Consent Decree so that the remaining Bell System may enter into unregulated markets (e.g., data processing).

Analog Data: Information represented in the form of continuously variable elements. The normal mode of transmitting telephone or voice signals has been analog, although increasingly digital encoding is taking place.

Basic Telecommunications Services: The Federal Communications Commission definition of common carrier transmission services which only result in the movement of information and do not involve the manipulation or restructuring of such information. (See enhanced telecommunications services.)

Bell Operating Companies: The 22 wholly-owned telephone companies within the Bell System which presently provide local and intrastate telephone service.

Bell System: American Telephone and Telegraph Co. and its subsidiaries, the Bell operating companies, the major providers of the Nation's local and intrastate telephone service; AT&T Long Lines, the largest interstate telephone network; Western Electric, the leading manufacturer of telecommunications equipment; Bell Laboratories, a provider of research and development service which is jointly owned by AT&T and Western Electric; and AT&T International, the international arm which markets Bell System products and services outside the United States. The AT&T 1982 Consent Decree calls for the divestiture of parts of the Bell System.

Bundled Rates: Rates in which the various rate elements which comprise the service are consolidated thereby making them indistinguishable. (See unbundled rates.)

Coaxial Cable: A cable composed of an inner wire conductor surrounded by a hollow cylindrical conductor with layers of insulation between them. Signals travel between the inner wire and the outer cylinder and do not radiate outside the cable.

Common Carrier: In telecommunications, a supplier that provides telecommunications services to the public, subject to State and Federal Communications Commission regulations.

Communications Satellite: A relay station that receives video, audio, data and other transmissions from duplinks and retransmits them to downlinks.

Cross Subsidization: The use of revenues or facilities of one product or service to allay the costs of another product or service.

Digital Data: Information represented by a code consisting of a sequence of discrete elements.

Enhanced Telecommunications Services: The FCC definition of common carrier transmission services which involve the manipulation, or alteration of basic telecommunications service offerings (e.g., data processing services).

Established Carriers: The common carrier firms which provide the Nation's telecommunications transmission services under regulation; AT&T Long Lines, the Bell Operating Companies, and the Independent telephone companies.

Exchange Access: The connection of interexchange carriers to the exchange carriers' local telecommunications network.

Exchange Carrier: A provider of telecommunications exchange service.

Exchange Network Facilities for Interstate Access (ENFIA) Agreements: FCC approved contractually negotiated agreements between the established carriers and

other common carriers (e.g., MCI) in which the other common carrier agrees to pay an approved access charge to the established carrier to obtain access to the local network for the provision of end-to-end service.

Exchange Service: Telephone service within a geographic area established by a regulated body which provides customers with the ability to originate calls within that local area, receive incoming calls, and obtain access to the message toll network. Under the AT&T 1982 Consent Decree service provided by a divested Bell operating company which remains within a local access and transport area.

Fiber Optics: The technology for transmitting light in thin glass fibers. It can be used to carry relatively large amounts of information long distances.

Independent Telephone Company: A firm which is not part of the Bell System, but is the designated established carrier for the provision of telecommunications common carrier service in a specific geographic area. There are approximately 1,500 such companies in the U.S. which provide 20 percent of the Nation's telephone service.

Interexchange Service: Telephone service between a point or points located in one exchange area and a point or points located in another or multiple exchange areas. Formerly characterized as either intrastate or interstate calls, interexchange calls under the 1982 AT&T Consent Decree will be intra-LATA or inter-LATA (Local Access and Transport Area). (See Exchange Service.)

Local Access and Transport Areas (LATA's): Geographic regions which represent the post-divestiture areas of the 22 Bell operating companies. All telephone service within a LATA is defined as exchange service, while service between LATA's is defined as interexchange service.

Local Bypass: Refers to the use of an alternative telecommunications system to that of the local established carrier's to gain direct access to customers inside a local exchange area.

Local Loop: A circuit connecting customer equipment to a switching facility or distribution point.

Measured Local Service: A method of pricing local telephone services based on the number, the duration, the time of day, and the distance of calls within the local exchange area instead of a flat all inclusive rate.

Message Switching: The technique of receiving a message, storing it until the proper outgoing line is available, and then transmitting it.

Message Toll Service (MTS): A non-private line intrastate and interstate long distance telephone service which permits local subscribers to establish two-way service on a message-by-message basis.

Natural Monopoly: A market situation in which it is considered to be more efficient and economical for a product or service to be provided by a single firm under regulation, than by two or more competing firms. The provision of telecommunications services was originally considered to be a natural monopoly market situation by many regulators.

Other Common Carrier (OCC): Any carrier authorized by the FCC to provide telecommunications services in competition with the established carriers (e.g., domestic satellite carriers and specialized common carriers).

Packet Switching: A data communications switching and transmission system whereby an input data stream is broken into unfirm packets to which is appended addressing information, sequence counts, and error controls. Each packet is transmitted independently through the network so as to maximize the utilization of transmission facilities, and at the receiving end the individual packets are resequenced and combined as necessary into the output data stream.

Resale Carrier: A carrier which leases circuits from a telecommunications common carrier and resells them to individual users for a profit.

Tariff: A statement filed by a telecommunications common carrier with the appropriate public regulatory agency which describes the service it offers and lists a schedule of charges for the use of that regulated telecommunications service.

Telecommunications: The transmission of signals of any kind by wire, radio, optical or other electromagnetic systems.

Unbundled Rates: Rates in which the various rate elements which comprise the service are separately stated, thereby enabling the identification of the charge for each component of the service. (See bundled rates.)

Usage Sensitive Record: A general term which refers to the charging for telephone service based on usage factors (e.g., duration and number of calls), in contrast to a flat fee charge. (See measured local service.)

Value Added Carrier: A carrier which leases circuits from telecommunications common carriers and then adds special services, such as computer oriented services, before retailing the use of the circuits to a final user.

Wide Area Telephone Service (WATS): A telephone service which allows a subscriber to make calls to specific geographic areas for a rate based on volume and time-of-day but generally less than that charged for message toll service. Customers may also purchase "800" service which permits the subscriber to receive calls placed from specific areas with no charge to the caller.

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